What is claimed:

1. A high-speed envelope transport and insertion machine comprising:

a slip-drive system comprising an upper drive portion and a lower drive portion, each of the upper drive portion and the lower drive portion comprising a plurality of laterally spaced apart belts disposed about a plurality of pulley elements and at least one driving member to move the plurality of belts of the upper drive portion and lower drive portion at a first speed;

an envelope transmission device disposed to input envelopes into the slip-drive between the plurality of belts of the upper drive portion and lower drive portion;

a plurality of gripping members disposed at intervals along a first drive member comprising a chain or belt disposed to pass between the plurality of laterally spaced apart belts and between the upper drive portion and lower drive portion, the first drive member being driven at a second speed lower than the first speed;

wherein envelopes input into the slip-drive are moved at a speed greater than a speed of the gripping members so that an envelope borne by the slip-drive overtakes a corresponding one of the plurality of gripping members and is registered therein,

wherein, upon registration of an envelope within a gripping member, the gripping member closes to retain the envelope.

2. A high-speed envelope transport and insertion machine according to claim 1, further comprising:

a plurality of gripping members disposed at intervals along a second drive member comprising a chain or belt disposed to pass between the plurality of laterally spaced apart belts and between the upper drive portion and lower drive portion, the second drive member being driven at the second speed,

wherein the first drive member and second drive member are disposed substantially laterally equidistant from a center of an envelope path in the slip-drive.

3. A high-speed envelope transport and insertion machine according to claim 2,

wherein the gripping members of the first drive member and second drive member are configured to open slightly while travelling within the slip-drive to receive an envelope carried by the slip-drive belts, and

wherein the gripping members of the first drive member and second drive member are configured to close following registration of the envelope within the gripping members.

4. A high-speed envelope transport and insertion machine according to claim 1, further comprising:

an envelope stuffing device;

wherein the gripping members transport the envelope to a stuffing device.

5. A high-speed envelope transport and insertion machine according to claim 1, further comprising:

at least one envelope registration stop biased by at least one of a spring and a resilient element out of a path of travel of an envelope,

wherein the gripping members activate the envelope registration stop by biasing the envelope registration stop into the path of the envelope as the gripping members open to release the envelope, and

wherein the envelope registration stop is configured to register the envelope.

6. A high-speed envelope transport and insertion machine according to claim 5,

wherein the envelope registration stop comprises two envelope registration stops disposed substantially laterally equidistant from a center of an envelope path.

7. A high-speed envelope transport and insertion machine according to claim 6, wherein the envelope registration stops are configured to drop out of the path of the envelope under the bias of the spring or resilient element following envelope registration to allow continued movement of the envelope along the path of the envelope in the envelope stuffing device.

8. A high-speed envelope transport and insertion machine according to claim 2, wherein the first drive member bearing a plurality of gripping members and the second drive member bearing a plurality of gripping members are continuously in motion during operation of the high-speed envelope transport and insertion machine, and

wherein a plurality of sets of gripping members, one gripping member from each set being disposed on a respective one of the first drive member and the second drive member, are disposed to pass between the plurality of laterally spaced apart belts and between the upper drive portion and lower drive portion to permit a plurality of envelopes to be transported at the same time.

9. A high-speed envelope transport and insertion machine according to claim 8, wherein the gripping members are configured to open and close while in motion.

10. A high-speed envelope transport and insertion machine according to claim 9, further comprising:

a sensor element provided on at least one of the first drive member and the second drive member; and

a control system configured to determine a position of the sensor element.

11. A high-speed envelope transport and insertion machine according to claim 10, wherein the control system is configured to determine a position of at least one of the

plurality of gripping members based on a known position of the sensor element and a known relation between the sensor element, the respective one of the first drive member and the second drive member, and positions of the gripping elements borne thereby.

12. A high-speed envelope transport and insertion machine according to claim 9, further comprising:

a stationary sensor;

wherein the stationary sensor is configured to detect a predetermined portion of a gripping member passing the sensor.

13. A high-speed envelope transport and insertion machine according to claim 12,

wherein the predetermined portion of a gripping member comprises at least one of a gripping member leading edge and trailing edge.

14. A high-speed envelope transport and insertion machine according to claim 1,

wherein the gripping members comprise a gripping member jaw rotatably disposed relative to a gripping member seat, and

wherein the gripping member jaw is spring-loaded to assume a normally closed position.

15. A high-speed envelope transport and insertion machine according to claim 14,

wherein the gripping member seat comprises at least one of a hardened steel seat and a non-metallic seat material having a Shore hardness of about 85D.

16. A high-speed envelope transport and insertion machine according to claim 14,

wherein a leading edge of the top-most surface of the gripping member seat is chamfered or rounded.

17. A high-speed envelope transport and insertion machine according to claim 16,

wherein a top-most surface of the gripping member seat is at least one of substantially planar and substantially planar with a forwardly placed lateral depression corresponding substantially in size and placement with a gripping member jaw shaft.

18. A high-speed envelope transport and insertion machine according to claim 17,

wherein the gripping member seat comprises, at a rearward portion thereof, an upwardly protruding envelope stop member provided to ensure proper registration of an envelope with respect to the gripping member.

19. A high-speed envelope transport and insertion machine according to claim 18, wherein:

the gripping member seat comprises lateral side plates attached thereto, each of the lateral side plates comprising a guide block protruding outwardly therefrom, and

the guide block comprising a tapered or rounded leading edge, a tapered or rounded trailing edge, and a substantially planar upper and lower surface therebetween.

20. A high-speed envelope transport and insertion machine according to claim 19, wherein:

the gripping member jaw comprises two lateral side members rotatably affixed to inner surfaces of the lateral side plates by a rotatable shaft,

upper portions of the gripping member jaw extend forwardly to clamp against the gripping member seat under a spring bias,

a lower portion of at least one of the two lateral side members comprises a lower idler portion having an idler bearing, and

upward displacement of the idler bearing causes rotation of the gripping member jaw upper portion away from the gripping member seat against a spring bias.

21. A high-speed envelope transport and insertion machine according to claim 20, further comprising:

a plurality of guide members disposed adjacent sprockets about which the first drive member and the second drive member are disposed to travel,

wherein the guide members are provided to receive and guide the gripping member guide blocks over at least a portion of an arc of travel of the gripping members about the sprockets.

22. A high-speed envelope transport and insertion machine according to claim 21,

wherein the guide members are disposed to guide the gripping members over an arc of travel of about 140° around at least one of the sprockets.

23. A high-speed envelope transport and insertion machine according to claim 22, further comprising:

a ramp provided along a path of travel of the gripping member to upwardly displace the gripping member idler bearing to cause rotation of the gripping member jaw upper portion away from the gripping member seat against a spring bias.

24. A high-speed envelope transport and insertion machine according to claim 22, further comprising:

a ramp provided within the slip-drive unit along a path of travel of the gripping member to upwardly displace the gripping member idler bearing to cause rotation of the gripping member jaw upper portion away from the gripping member seat against a spring bias so as to enable receipt and registration of an envelope.

25. A high-speed envelope transport and insertion machine according to claim 24,

wherein the ramp comprises a chamfered or rounded leading edge, a substantially planar plateau, and a chamfered or rounded trailing edge.

26. A high-speed envelope transport and insertion machine according to claim 23, wherein:

the ramp is provided in the slip-drive system,

the ramp leading edge and plateau respectively cause and maintain an upward displacement of the gripping member jaw idler bearing to open the gripping member jaw and permit receipt of an envelope within the opening defined between the top-most surface of the gripping member seat and the forwardly extending upper portions of the gripping member jaw,

substantially concurrently with the opening of the gripping member jaw, an envelope carried by the slip-drive system overtakes and is inserted into the opening, and

the ramp trailing edge permits a controlled downward movement of the gripping member jaw idler bearing to close the gripping member jaw and hold the envelope between the top-most surface of the gripping member seat and the forwardly extending upper portions of the gripping member jaw.

27. A high-speed envelope transport and insertion machine according to claim 24, wherein:

another ramp is provided in the envelope stuffing device,

the envelope stuffing device ramp leading edge and plateau respectively cause and maintain an upward displacement of the gripping member jaw idler bearing to open the gripping member jaw and permit discharge of the envelope borne thereby,

substantially concurrently with the opening of the gripping member jaw, an envelope registration stop is biased into a path of the envelope and decelerates the envelope relative to the gripping member jaw, which travels at a substantially constant speed, to remove the envelope from the gripping member jaw, and

following removal of the envelope from the gripping member jaw, a trailing edge of the envelope stuffing device ramp permits a controlled downward movement of the gripping member jaw idler bearing to close the gripping member jaw.

28. A high-speed envelope transport and insertion machine according to claim 2, wherein the belts of the upper drive portion and lower drive portion are driven at a speed between about 1.5 and 4.0 times the speed at which the first drive member and second drive member are driven.

29. A high-speed envelope transport and insertion machine according to claim 28, wherein the upper drive portion and lower drive portion are rotatable relative to one another.

30. A high-speed envelope transport and insertion machine according to claim 19, wherein the envelope registration stop is biased into a path of the envelope by the gripping member guide block leading edge, maintained in the path of the envelope by the gripping member guide block substantially planar upper surface, and permitted to move out of the path of the envelope by the gripping member guide block trailing edge.

31. A high-speed envelope transport and insertion machine comprising:

a slip-drive system comprising an upper drive portion and a lower drive portion, each of the upper drive portion and the lower drive portion comprising a plurality of laterally spaced apart belts disposed about a plurality of pulley elements and at least one driving member to move the plurality of belts of the upper drive portion and lower drive portion at a first speed;

an envelope transmission device disposed to input envelopes into the slip-drive between the plurality of belts of the upper drive portion and lower drive portion;

a plurality of gripping members disposed at intervals along a first drive member comprising a chain or belt disposed to pass between the plurality of laterally spaced apart belts and between the upper drive portion and lower drive portion, the first drive member being driven at a second speed lower than the first speed; wherein:

envelopes input into the slip-drive are moved at a speed greater than a speed of the gripping members so that an envelope borne by the slip-drive overtakes a corresponding one of the plurality of gripping members and is registered therein, and

upon registration of an envelope within a gripping member, the gripping member closes to retain the envelope,

the first drive member is continuously in motion during operation of the high-speed envelope transport and insertion machine and the gripping members are configured to open and close while in motion,

each of the gripping members comprises a gripping member jaw rotatably disposed relative to a gripping member seat, and

the gripping member jaw is spring-loaded to assume a normally closed position.

32. A high-speed envelope transport and insertion machine comprising:

a slip-drive system having a plurality of belts configured to move envelopes along an envelope path at a first speed;

an envelope transmission device disposed to input envelopes into the slip-drive system;

an envelope stuffing device comprising a registration member; and

a drive member having a plurality of spaced-apart gripping members disposed to move continously between the slip-drive system and the envelope stuffing device at a second speed less than the first speed,

wherein the path of the gripping members and the envelopes crosses within the slip-drive system to permit the gripping member to engage and grip the envelope, and

wherein the gripping member is configured to release the envelope following registration of the envelope against the envelope stuffing device registration member.